

Amendments to the Specification:

Please insert the following paragraph at page 6, line 15.

Fig. 6 depicts apparatus for combining payload data modulation and utility data modulation using spread spectrum techniques according to another embodiment of the present invention.

Please replace the paragraph beginning at page 9, line 7, with the following amended paragraph:

In an exemplary modulation system, a summer 104 combines the spread spectrum signal with the payload data. Conversion from digital to analog may be before or after summer 104. The spread spectrum signal is scaled to have an amplitude 5% of that of the payload data signal. Optionally, forward error correction (not shown) encoding may be applied to the spread spectrum signal. The sum of the utility data spread spectrum signal and the payload data is used to drive a laser 106 that generates the optical signal which is thereby modulated with both the utility data and the payload data. This modulated signal is at wavelength λ_m . An optical add multiplexer 108 receives a WDM signal having wavelengths components λ_1 through λ_r and also receives the output of laser 106. Optical add multiplexer 108 outputs a combined signal including the wavelength components received via both inputs.

Please replace the paragraph beginning at page 9, line 18, with the following amended paragraph:

Fig. 1, however, only represents one example of how the utility data spread spectrum signal and the payload data may be combined. Fig. 2 depicts an alternative scheme for

combining the utility data spread spectrum modulation and payload data modulation. The scheme of Fig. 2 is particularly useful where the payload data has a very high bit rate such as 10 Gbps or more and it is not practical to use the payload data to directly vary the output power of laser 106. Accordingly, an alternate modulation system is employed. The spread spectrum signal output by spread spectrum processing block 102 is used to drive the input to laser 106 without summing in the payload data signal. The current input to laser 106 is appropriately scaled in accordance with the operating parameters of the laser. The optical output of laser 106 is input to an optical modulator 202 such as a lithium niobate modulator as known in the art. The modulation input to modulator 202 is fed by the payload data. It would also be possible, according to the present invention, to combine the payload data and the utility data spread spectrum signal using a summer and then use this sum as the modulation input to modulator 202 while maintaining the input signal to laser 106 at constant power, as illustrated in Fig. 6.